

Unit 4 Review

In addition to knowing vocab definitions, be sure you can apply them to understand the following:

Ch 9

- Chromosome structure
 - What is the difference between chromatin, chromatids, and chromosomes?
- Gametes vs Somatic Cells
 - Are they reproductive or nonreproductive cells?
 - How many sets of chromosomes do they have?
 - How many chromosomes do humans have in each type of cell?
 - By what process are they formed?
- Interphase vs Mitosis vs Cytokinesis
 - What are the major features of each part of the cell cycle?
 - During which phases do you see cell growth, DNA synthesis, division of nuclear material, division of cytoplasm?
 - During what phase do cells spend most of their time?
 - How much genetic material is present at each part of the cell cycle?
- Phases of Mitosis
 - What are the major features of each phase of mitosis?
 - What is being formed, broken down, moved, and how?
 - How would the chromosomes look in each phase?
 - What problems could result in the cell if a certain phase was inhibited?
- Control of the Cell Cycle
 - What proteins are involved in regulating the cell cycle?
 - What external signals are involved in regulating cell division (and how)?
 - How is this different in cancer cells?

Ch 10

- Asexual vs Sexual Reproduction (mentioned at beginning and end of chapter)
 - How are these means of reproduction different?
 - What are the advantages and disadvantages of each?
- Sets of Chromosomes
 - How many chromosomes are in diploid vs haploid cells?
 - How many of those are autosomes vs sex chromosomes?
 - Given an organism's diploid number, how many of the following does it have?
 - Total chromosomes vs chromatids
 - Homologous pairs (or sets) of chromosomes
 - Chromosomes after S phase vs after meiosis vs after fertilization
 - What happens to the number of chromosomes during mitosis vs meiosis?
- Sexual Life Cycles
 - What do the 3 life cycles have in common?
 - How do they differ?
 - What life cycles are typical of which kinds of organisms?
 - What is meant by alternation of generations?
 - What is the difference between sporophytes vs gametophytes?
 - What processes lead to the formation of gametes vs zygotes vs (in some cases) spores?
 - What processes result in diploid vs haploid cells? (mitosis vs meiosis vs fertilization)

- Meiosis
 - What is the difference between sister chromatids and homologous chromosomes?
 - When do chromatids vs homologous chromosomes line up vs split apart?
 - What are the major features of each phase of meiosis (I and II)?
 - What is being formed, broken down, moved, and how?
 - How would the chromosomes look in each phase?
 - How could cells end up with too many or too few chromosomes?
 - What happens to the chromosome number after Meiosis I vs Meiosis II?
 - What similarities and differences exist in mitosis vs meiosis I vs meiosis II?
 - During what phases of mitosis vs meiosis do these similarities vs differences occur?
- Genetic Variation
 - What three mechanisms contribute to genetic variation during meiosis and/or fertilization and HOW do they do so?

Ch 16 and 36.4

- Embryonic Development
 - What 6 developmental processes transform a zygote into an adult and HOW do they do so?
 - What is the correct sequence of developmental milestones?
 - Fertilization vs cleavage vs blastula vs gastrula
 - How is polyspermy prevented and why is this important?
 - What is the result of gastrulation?
 - What would happen if gastrulation was blocked?
 - Why are homeotic genes so important?
 - How would an error in the bicoid gene affect development?
- Cloning and Stem Cells
 - What is the difference between totipotent vs pluripotent vs multipotent cells?
 - How are some animals cloned?
 - What is the difference between reproductive and therapeutic cloning?
 - How do embryonic stem cells and adult stem cells differ?
 - What are induced pluripotent stem cells and how are they transformed?
- Abnormal Regulation
 - What is the function of proto-oncogenes vs tumor-suppressor genes?
 - How do changes in these genes contribute to cancer?